

WO 03/103003

- 14 -

PCT/FR03/01661

CLAIMS

1. A device for producing a plasma (16) in a chamber comprising means for producing an energy in the microwave spectrum for the excitation of the plasma, said means comprising at least one basic plasma excitation device comprising a coaxial applicator (4) of microwave energy, of which one end is connected to a production source (7) of microwave energy, the other end (8) being directed to the gas to be excited within the chamber, characterized in that each basic excitation device is arranged in the wall (3) of the chamber, each applicator (4) comprising a central core (5) which is substantially flush with the wall of the chamber, the central core and the thickness of the wall (3) of the chamber being separated by a space (6) coaxial with the central core, this space being completely filled at least at one end of each applicator with a dielectric material (14) such that said material is substantially flush with the level of the wall of the chamber.
2. The device as claimed in claim 1, characterized in that the dielectric material (14) is refractory.
3. The device as claimed in claim 2, characterized in that the dielectric material (14) is made of an alloy of silica and/or of aluminum nitride and/or of alumina.
4. The device as claimed in one of claims 1 to 3, characterized in that the dielectric material fills the entire coaxial space (6).

- 15 -

5. The device as claimed in one of claims 1 to 3, characterized in that the length of the dielectric material is equal to an integral number of half-wavelength of the microwaves in the dielectric material.
10. The device as claimed in one of claims 1 to 5, characterized in that it comprises O-rings (21) inserted between the dielectric (14), the central core of an applicator and the internal wall of the applicator.
15. The device as claimed in claim 6, characterized in that each O-ring (21) is embedded in the internal and external walls of the coaxial structure.
20. The device as claimed in one of claims 1 to 7, characterized in that a central core (5) terminates in a permanent magnet (22) encapsulated in the central core and flush with the walls of the chamber.
25. The device as claimed in one of claims 1 to 8, characterized in that it comprises a dielectric plate (20) that extends to the interior of the chamber on the internal wall thereof, said plate completely covering the plasma excitation devices.
30. The device as claimed in one of claims 1 to 9, characterized in that it comprises means (12) for cooling each applicator (4) in the chamber walls.
35. The device as claimed in one of claims 1 to 10, characterized in that it comprises means for cooling the applicators in the central core (5) of each applicator (4).

- 16 -

5 12. The device as claimed in one of the preceding claims, characterized in that the pressure of the plasma (16) is between a value of about 1 millitorr and a value of about a few tens of torr.

10 13. The device as claimed in one of the preceding claims, characterized in that it comprises a plurality of applicators (4), the applicators being arranged in a two-dimensional network in the wall of the chamber in order to obtain the desired applicator density for a desired pressure range.